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BUTCHER,E.J. Operating Reactors Branch 3

SUBJECT: Forwards response to SER open items identified in NRC 850425 ltr re Reg Guide 1.97 & Rev 1 to "Emergency Evaluation of Instrumentation Sys for Reg Guide 1.97,Rev 3" for Units 1 & 3,respectively.

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FLORIDA POWER & LIGHT COMPANY

NOV 1 8 1985

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Office of Nuclear Reactor Regulation
Attention: Mr. Edward J. Butcher, Acting Chief
Operating Reactors Branch #3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Butcher:

Re: St. Lucie Unit Nos. 1 & 2
Docket Nos. 50-335 & 50-389
Conformance to Regulatory Guide 1.97
NRC TAC Nos. 51135 & 51136

Attached is Florida Power & Light Company's response to the open items identified in the interim report contained in NRC's letter of April 25, 1985. Also attached are the revised Regulatory Guide 1.97 Evaluation Reports for St. Lucie Units 1 & 2.

Very truly yours,

J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/GRM/gp

Attachments

cc: Dr. J. Nelson Grace, Region II, USNRC
Harold F. Reis, Esquire

A003
1/1

Re: St. Lucie Unit Nos. 1 & 2
Docket Nos. 50-335 & 50-389
Conformance to Regulatory Guide 1.97

ATTACHMENT 1

RESPONSE TO NRC

REQUEST FOR ADDITIONAL INFORMATION

DATED APRIL 25, 1985

ON REGULATORY GUIDE 1.97 REV. 3 REPORT

ATTACHMENT

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ATTACHMENT 1

St. Lucie Units 1 and 2
Engineering Response to the
NRC Evaluation of FPL R.G. 1.97 Report

I. Background

On December 17, 1982, NRC issued Generic Letter 82-33 (Reference 1) to all licensees. In that letter, NRC required that all licensees of operating reactors, applicants for operating licenses and holders of construction permits provide an evaluation of the conformance of their plant(s) to Regulatory Guide (RG) 1.97, Rev. 2 (Reference 2). In FPL letters dated December 30, 1983 (Reference 3) and November 30, 1983 (Reference 4), FPL provided the required evaluations for St. Lucie Units 1 and 2 respectively. These evaluations were performed against the requirements of R.G. 1.97 Rev. 3 (Reference 5) which was issued subsequent to Generic Letter 82-33.

In an NRC letter dated April 25, 1985 (Reference 6), the staff provided an interim report on St. Lucie Units 1 and 2's conformance to R.G. 1.97. The report, which was prepared by EG&G Idaho for NRC, only addresses exceptions taken to the guidance of R.G. 1.97.

II. Discussion

NRC's letter dated April 25, 1985 requested that the applicant review the staff's report of R.G. 1.97 and identify any incorrect assumptions or commitments that may be beyond the scope of previous FPL responses The following information is provided in response to each of the open items identified in the staff's SER. (Refer to section 3.3 of the NRC report.)

3.3.1 Neutron Flux (Item B-1)

During the last refueling outage for St. Lucie Unit 2, two completely qualified post accident monitoring channels for this variable were installed. These new channels comply with the requirements of R.G. 1.97 for both range and qualification. The revised R.G. 1.97 report for St. Lucie 2 reflects these changes.

St. Lucie 1 is scheduled to install two new neutron flux monitoring channels by the end of the next refueling outage. These channels will comply with the requirements of R.G. 1.97 Rev. 3.

FPL concludes that Unit 2 is in full compliance with 1.97 for this variable and that Unit 1 will comply by the end of the next refueling outage.

3.3.2 RCS Soluble Boron Concentration (Item B-3)

R.G. 1.97 recommends continuous reading instrumentation with a range of 0 to 6000 PPM for this variable. FPL takes exception to this requirement. Instrumentation is provided that covers ranges of 0 to 2050 PPM (Unit 1) and 0 to 1250/5000 PPM (Unit 2) for this variable. In addition, boron concentration can also be measured by grab sampling and by post accident sampling.

EG&G identified that this exception was beyond the scope of their review and is being addressed by NRC as part of the review of NUREG-0737, Item II.B.3 "Post Accident Sampling". FPL notes that the NRC has approved the Post Accident Sampling System (PASS) for St. Lucie Unit 1 (Reference 7) and 2 (Reference 8) with the exception of the Core Damage Assessment Procedure, which was approved on an interim basis. A final Core Damage Assessment procedure has been approved for St. Lucie Plant by the staff (Reference 9). FPL concludes that since the PASS for both St. Lucie 1 & 2 has been found acceptable to NRC, the deviations from R.G. 1.97 for this variable are acceptable.

3.3.3 RCS Hot Leg and Cold Leg Water Temperature (Items B-5 and B-6)

R.G. 1.97 recommends RCS hot leg and cold leg temperature instrumentation with a range of 50°F to 700°F. For St. Lucie Unit 1, FPL provides instrumentation with a range of 212°F to 705°F. St. Lucie Unit 2 complies with the requirements of R.G. 1.97.

FPL believes the existing instrumentation for St. Lucie 1 is adequate for its intended function. The purpose of RCS hot and cold leg temperature indication is to determine RCS fluid temperature and to assure core heat is being removed by assuring a Δt between hot and cold leg temperatures. For temperatures where the RCS temperature is below 350°F, the Shutdown Cooling (SDC) System would be in operation, taking suction from the hot legs (normal) or the containment sump (post LOCA) and discharging into the RCS at the outlet of the Reactor Coolant pumps. In this instance other instrumentation is available to determine RCS temperatures as discussed below.

When the shutdown cooling system is in operation hot leg temperatures would be closely represented by the Core Exit Thermocouples (CETs), which have a range of 32°F to 2300°F. This instrumentation, which is part of the Inadequate Core Cooling System (ICCS), is fully qualified for post LOCA environment. Since the range of the CETs overlaps the required range for RCS hot leg temperature, new hot leg RTD's are not required.

When SDC is in operation, cold leg temperatures would be closely represented by SDC temperature element TE3351 Y (located on the LPSI header) which provides control room indication (TR-3351). This instrument has a range of 0 to 400°F, which overlaps the range recommended for the cold leg RTDs.

Because other instrumentation is available for determining hot and cold leg temperatures below 212°F, expanded range for the hot and cold leg RTDs is not required.

3.3.4 RCS Pressure (Pressurizer Pressure Item B-7)

R.G. 1.97 recommends providing instrumentation with a range of 0-4000 psig for this variable. FPL provides instrumentation with a range of 0-3000 psig, which is adequate to monitor all expected RCS pressures based on plant accident analysis. This deviation is considered acceptable pending resolution of ATWS. FPL will address the ATWS issue when resolution is completed by the Combustion Engineering Owners Group (CEOG).

3.3.5 Containment Isolation Valve Position (Item B-14)

Acceptable to NRC.

3.3.6 Radioactivity Concentration or Radiation Level in Circulating Primary Coolant (Item C-2)

In FPL's response to R.G. 1.97 (Reference 3, 4), we identified this item as an area for additional study.

FPL has completed a feasibility study and market research which has determined that detection systems currently on the market cannot provide the operators with unambiguous information concerning the condition of the fuel cladding. Therefore, we believe that detection of fuel cladding failure is more precisely determined by obtaining a primary coolant grab sample. This capability presently exists at St. Lucie Unit Nos. 1 & 2 in the Post-Accident Sampling System in accordance with requirements and guidance discussed in NUREG-0737 "Clarification of the TMI Action Plan Requirements."

Therefore, FPL proposes to employ the grab sampling capabilities of the Post-Accident Sampling System to comply with the intent of Reg. Guide 1.97, Rev. 3 for this variable.

3.3.7 Accumulator Tank Level and Pressure (Item D-3)

R.G. 1.97 recommends level instrumentation with a range of 10-90% for accumulator tank level. For St. Lucie 1, FPL deviates from this requirement by providing level instrumentation with a range of 20-60%.

At St. Lucie 1, to maintain the Technical Specification required level in the Safety Injection Tanks (SITs, aka accumulators), the Hi and Low alarm set points are set only 3% apart. This is 3% of the existing narrow range differential. Expanding the range will decrease accuracy causing operating difficulty and alarm recognition problems without any tangible benefits. For the above reason, FPL considers the existing range on this instrumentation adequate for its application.

In addition, R.G. 1.97 recommends that SIT level and pressure instrumentation be environmentally qualified. FPL took exception to this requirement in our original R.G. 1.97 submittals for St. Lucie Units 1 and 2. The staff has identified that for environmental qualification, R.G. 1.97 has been superseded by 10CFR50.49.

The Safety Injection Tanks are passive safety devices whose safety function is to reflood the reactor core following the blowdown phase of a large break Loss of Coolant Accident (LOCA). Four SITs are connected to the RCS, one to each cold leg. Between the RCS and SIT is piping containing one locked open motor operated valve and one check valve to prevent backflow of reactor coolant into the SIT.

Following the blowdown phase of a LOCA, the contents of each SIT are injected into the RCS by the expansion of the pressurized N_2 cover gas over each SIT. The SIT pressure and level instrumentation function to provide operator information so that sufficient water and pressurized gas can be maintained in each SIT in the event of a LOCA.

Should a LOCA occur, the SIT level and pressure instrumentation would provide no information from which any operator actions could be taken, to ensure: (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe shutdown condition, and (iii) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the 10CFR Part 100 guidelines. Since the SITs are a totally passive system, proper operation of the tanks will occur without operator intervention should RCS pressure fall below SIT pressure.

For the above stated reasons, environmental qualification of either SIT level or pressure is not required per the requirements of 10CFR50.49.

3.3.8 Refueling Water Storage Tank Level (Item D-8)

Acceptable to NRC.

3.3.9 Pressurizer Level (Item D-11)

In our original submittals on R.G. 1.97 for St. Lucie Units 1 & 2 (Reference 3 and 4), FPL identified that the instrumentation for determining pressurizer level is narrow range. This referred to the instrument calibration range of 175" to 349" W.C. differential pressure, which corresponds to wide range pressurizer level when the pressurizer is at 650°F (i.e., hot calibrated instrumentation).

FPL concludes that with the above instrumentation for pressurizer level meets the intent of R.G. 1.97 requirements.

3.3.10 Pressurizer Heater Status (Item D-12)

R.G. 1.97 recommends that pressurizer heater current indication be provided in the control room. This instrumentation is recommended to assure overloading of a diesel generator will not occur. FPL provides

pressurizer heater current indication, but for Unit 1 this instrumentation is locally indicated. Unit 1, however, is provided with Control Room indication of pressurizer heater kilowatts. Since this is a more direct indication of a possible DG overload condition, Unit 1 complies with the intent of R.G. 1.97.

3.3.11 Quench Tank Level (Item D-13)

Acceptable to NRC.

3.3.12 Quench Tank Temperature (Item D-14)

Acceptable to NRC

3.3.13 Steam Generator Level (Item D-16)

R.G. 1.97 recommends wide range instrumentation (tube sheet to the separators) be provided for this variable. FPL provides redundant qualified instrumentation for steam generator level, however it is narrow range. A wide range non-safety channel is available and meets the recommended range, but it is not Category 1 instrumentation.

FPL considers the existing instrumentation at St. Lucie to be adequate for its intended function. R.G. 1.97 requires certain instrumentation to "provide information required to permit the operator to take preplanned manual actions to accomplish safe plant shutdown" (i.e., accident identification and mitigation) and to determine if systems important to safety are performing their intended function (i.e., availability of the SGs as heat sinks).

Low steam generator level is an indicator of a number of possible events; including a Main Steam Line Break (MSLB), Loss of Feedwater (LOFW) and Loss of Load (LOL) events. For each of these events, however, the qualified SG pressure instrumentation must be used for identification of the specific transient.

The accident analyses in Chapter 15 of the Final Safety Analysis Reports (FSAR) for both St. Lucie Units 1 and 2 address these events. In all cases, no operator action is credited during the first minutes of an event. Automatic actions will protect the plant until the operator can identify the event, using the existing instrumentation, and take appropriate action.

The availability of the SGs as heat sinks is determined from SG pressure. Other instrumentation available to determine SG availability are the auxiliary feedwater system pressure and flow instrumentation and the main feedwater flow instrumentation. This additional information is sufficient to assess SG availability as a heat sink for the RCS.

FPL considers the existing instrumentation adequate for its function.

3.3.14 Safety/Relief Valve Positions or Main Steam Flow (Item D-18)

R.G. 1.97 recommends that the instrumentation provided to monitor this variable be environmentally qualified. FPL provides instrumentation with proper range and that is partially qualified, but not fully qualified for in-containment post-accident operation.

The main steam flow instrumentation at St. Lucie provides both operator indication and input to the feedwater control system and turbine runback calculator (Unit 1). No safety grade functions are operated from this instrumentation.

The intent of the R. G. 1.97 requirement for this instrumentation is to provide indication of a possible misoperation of a main steam safety or relief valve. The misoperation of a relief valve would result in a high steam flow condition which would be identified by the main steam flow instrumentation. Since the main steam safeties are outside containment and the main steam flow instrumentation is inside containment, no environmental qualification concern is present.

For a MSLB inside containment, the environmental qualification of the main steam flow instrumentation would be challenged. However, for this event this instrumentation would provide no input to any safety system.

Operator identification and safety system actuation for a MSLB inside containment is provided by steam generator pressure and level and by containment pressure.

Since other instrumentation is provided which would provide information of a MSLB inside containment, FPL considers the existing instrumentation adequate for its intended function.

3.3.15 Main Feedwater Flow (Item D-19)

This item was identified as being acceptable to NRC. The design main feedwater flow is 5.85×10^6 lb/hr, which would require a 0 to 6.4×10^6 lb/hr instrument range. The existing range is close to the required range and will adequately monitor operation of this system in post-accident conditions. This is an acceptable deviation from R.G. 1.97.

3.3.16 Heat Removal By the Containment Fan Heat Removal System (Item D-23)

R. G. 1.97 recommends that the instrumentation provided for this variable be environmentally qualified. FPL has taken exception to this position, since these instruments perform no safety function during or after an accident.

During a design basis event (LOCA or MSLB), all four containment fan coolers receive a start signal and remain operational during the event. Containment Heat Removal, which is the safety function of the containment fan coolers, is directly indicated by containment atmosphere temperature instrumentation. Since the containment atmosphere temperature indication is fully qualified and provides the necessary information on containment temperature, qualified containment fan cooler RTDs are not required.

3.3.17 Containment Atmosphere Temperature (Unit 1 only) (Item D-24)

Acceptable to NRC.

3.3.18. Letdown Flow-Out (Unit 1 only) (Item D-27)

Acceptable to NRC.

3.3.19 Volume Control Tank Level (Item D-28)

R.G. 1.97 recommends instrumentation with a range of top to bottom for this variable and that is environmentally qualified. For Unit 2, FPL provides instrumentation with a range of 14.1 to 85.9% of the tank volume. This is considered acceptable since the normal operating range of this tank is 38 to 56%. Low and high level control room annunciation will notify the operator of any deviation from this band. Therefore the existing range for this instrumentation is considered adequate for its intended use.

The VCT is used during normal plant operation for controlling RCS volume and chemistry. During an accident, the VCT is isolated, with the charging pumps taking suction from either the Boric Acid Makeup (BAM) tanks or the Refueling Water Storage Tank (RWT). Since the VCT is not required to mitigate the consequences of an accident, environmental qualification of the associated level instrumentation is not required.

3.3.20 High Level Radioactive Liquid Tank Level (Item D-31)

Acceptable to NRC.

3.3.21 Radiation Exposure Rate (inside buildings or areas where access is required to service equipment important to safety Item E-2))

R.G. 1.97 recommends Category 3 instrumentation with a range of 10^{-1} to 10^{4} R/hr. FPL identifed that a complete low range monitoring system is provided in the Auxiliary Building of both Units. The revised R.G. 1.97 reports for St. Lucie Units 1 and 2 identify the range and location of these instruments.

3.3.22 Containment or Purge Effluent (Item E-3)

Acceptable to NRC.

3.3.23 Estimation of Atmospheric Stability (Item E-16)

Acceptable to NRC.

III. References

1) NRC letter, D. G. Eisenhut to all licensees of operating reactors, applicants for operating licenses and holders of construction permits, "Supplement No. 1 to NUREG-0737—Requirements for Emergency Response Capability (Generic Letter No. 82-33)," December 17, 1982.

2) Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident, Regulatory Guide 1.97, Revision 2, U. S. Nuclear Regulatory Commission (NRC), Office of Standards Development, December 1980.

3) Florida Power and Light Company letter L-83-605, J. W. Williams, Jr. to Director, Office of Nuclear Reactor Regulation December 30, 1983.

4) Florida Power and Light Company letter L-83-573, J. W. Williams, Jr. to Director, Office of Nuclear Reactor Regulation, November 30, 1983.

5) Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident, Regulatory Guide 1.97, Revision 3, U. S. Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research, May 1983.

6) NRC letter, J. R. Miller (NRC) to J. W. Williams, Jr. (FPL), "Conformance to Regulatory Guide (RG) 1.97, Revision 2", April 25, 1985.

7) NRC letter, J. R. Miller (NRC) to J. W. Williams, Jr. (FPL) "Post Accident Sampling System (NUREG-0737), Item II.B.3)", September 28, 1983.

8) NUREG-0843 Supplement 3 Safety Evaluation Report Related to the Operation of St. Lucie Plant, Unit No. 2, April 1983.

9) NRC letter, J. R. Miller (NRC) to J. W. Williams, Jr. (FPL) "Core Damage Assessment Procedure", March 8, 1985.